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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,743	02/08/2002	Saikumar Jayaraman	042390.P12130	2880

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EXAMINER

HU, HENRY S

ART UNIT PAPER NUMBER

1713

DATE MAILED: 03/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/071,743

Applicant(s)

JAYARAMAN ET AL.

Examiner

Henry S. Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on January 29, 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14, 16-20 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16-20 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the Amendment filed on January 29, 2004. Claim 15 and non-elected Claims 21-28 were canceled, and Claims 1, 9, 11, 16 and 18 were amended, and **new parent Claim 29** was added. **Parent Claim 1** was amended to recite the limitation of Claim 15 that using “a metallic fusible filler material having a melting temperature approximately between 100 and 250°C”. **Parent Claim 18** was amended to recite the limitation that using both a non-fusible particle filler and a fusible filler but with different melting points. The examiner confirms the support as stated by the Applicants in specification.

With respect to the specification objections (a) - (e), the Applicants have amended the abstract on page 17 and the paragraphs beginning in page 9 at paragraph 28, page 10 at paragraph 30, and page 11 at paragraph 34 as suggested by the examiner. In view of above amendment, the specification objections (a) - (e) and claim objections for Claims 11 and 15-16 are now removed. **Claims 1-14, 16-20 and 29 are now pending.** An action follows.

Claim Rejections - 35 USC 102

and

Claim Rejections - 35 USC § 103

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2. The limitation of amended parent Claim 1 in present invention relates to *a thermal interface material comprising a phase change polymer and a metallic fusible filler material having a melting temperature approximately between 100 and 250°C. The other parent Claim 18 and new parent Claim 29 relate to Claim 1 and with a non-fusible particle filler or with metal or metal alloy as fusible filler. See other limitations of Claims 2-14, 16-17 and 19-20.*

3. Regarding the three parent claims, **Claim 1** was only amended to recite the limitation of Claim 15 that using a metallic fusible filler material having a melting temperature approximately between 100 and 250°C. **Claim 18** was only amended to recite the limitation that using both a non-fusible particle filler and a fusible filler but with different melting points. **New Claim 29** directly relates to Claim 1 but with selected metal or metal alloy as fusible filler. Since all the claims are still under the scope of previous rejections, the same rational recited in **paragraphs 6-13** of the previous office action dated 10-22-2003 is incorporated herein by reference.

Therefore, **all the rejections are sustained** with following discussion.

Response to Argument

4. Applicant's Amendment filed on January 29, 2004 has been fully considered but they are not persuasive. The focal arguments related to the patentability will be addressed as follows:

5. **Applicants:** Applicant has claimed an unexpected way of obtaining a thermal interface material comprising a phase change polymer and a metallic fusible filler. Additionally, the

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Applicants claim that metallic fusible filler has a melting temperature approximately between 100 and 250°C. The Applicants claim that none of the prior art including Nguyen et al. and Salyer et al. has the above limitation.

6. **Examiner:** Since all three parent Claims 1, 18 and 29 are still carrying the same scope of limitations, particularly in the fusible filler having a melting point range. As discussed in the previous office action for the rejection of Claim 1, the thermally conductive filler such as alloys in (C) used by **Nguyen** does read on this limitation as a metallic fusible filler since it is a substance composed of two or more metals or a metal and a nonmetal intimately united usually by being fused together and dissolving in each other when molten (see Webster Dictionary).

7. In a close examination, the examiner has done a further search and has found a support on the melting point as **US Patent No. 5,328,087 to Nelson et al.**, which disclose in the preparation of a thermally and electrically conductive adhesive material, **metallic fillers such as solder or fusable alloy can be liquid at the cure temperature (160 to 250 °C)** of adhesive thereby enhancing the surface contact and later solidify at room temperature (column 2, line 3-16; column 3, line 30-54).

8. With respect to other previous rejection on Claim 1 by **Salyer**, the fusible filler has been amended to a metallic one, it is obvious to **replace the organic fusible filler with solder or fusable alloy having a similar melting point as long as they are compatible with the other components.**

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With respect to **Claim 18** and **new Claim 29**, both directly relate to Claim 1 and with a non-fusible particle filler or with metal or metal alloy as fusible filler. It is noted that both two fillers with melting points cited in Claim 18 are conventional in the art. Therefore, the same rationale recited in the above rejection of Claim 1 can be applied.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

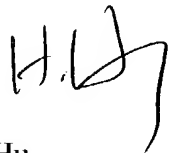
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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10. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

March 5, 2004



PETER D. MULCAHY
PRIMARY EXAMINER